

Emmanuel College: Nixon, Austin, Sutton, Rothera, Banham.

Sidney Sussex College: Bullough, Colt, Drapes, Fearnshides, Harrison, Humphrey, Robinson, Gough.

THE *Appointments Gazette*, which is the journal of the Cambridge Appointments Association, gives in its last issue (June 1900) much valuable information regarding scientific and other posts open to university graduates. It also contains articles on post graduate work in medicine, by Prof. Allbutt; on training for business, by Mr. G. E. Foster; and on Long Vacation courses in French, by Mr. H. J. Millar. A list of some two hundred graduates seeking appointments in various departments of industry, with their university qualifications, ages, &c., completes the journal. This list might be consulted with advantage by heads of departments and others in search of suitable candidates for vacant appointments. The Association is doing a useful work in bringing together employers and employed in the various walks of life where university training is of importance, and it already possesses a large and influential membership. The Master of Trinity is chairman, Mr. W. N. Shaw, F.R.S., vice-chairman, and Mr. W. A. J. Archbold, secretary.

PROF. OLIVER J. LODGE, F.R.S., has been appointed Principal of the University of Birmingham.

THE following appointments at the University College of North Wales, Bangor, are announced:—Mr. W. W. Firth to be assistant lecturer in Electrical Engineering, and Mr. Alexander Darroch to be assistant lecturer in the Day Training Department. Mr. W. Cadwaladr Davies was appointed the representative of the Council upon the Central Welsh Board, and Mr. H. Bulkeley Price the representative on the Carnarvonshire County Governing Body.

DR. JOHN WILLIAM WHITE, of Philadelphia, has been elected to the John Rhea Barton Chair of Surgery in the University of Pennsylvania; Dr. Frank Morley, of Haverford College, has been appointed professor of mathematics in Johns Hopkins University, vice Prof. Thomas Craig, resigned; Prof. Charles J. Bartlett takes the place of Prof. M. C. White, who for thirty-three years has filled the chair of pathology in the Medical School of Yale University.

THE Report of the Council to the Governors of the City and Guilds of London Institute, dated March 1900, has just been issued, and gives a full account of the work accomplished in connection with the year 1899, and contains verbatim reports of the addresses delivered respectively by Sir Andrew Noble and Sir Douglas Fox at the opening of the session, and at the distribution of certificates and prizes. We notice from the report that during the past twenty years the work of the Examinations Department has developed to an enormous extent: thus in 1888 the number of subjects of examination was 24, the number of centres of examination 89, and the number of candidates 816. In 1899 the number of subjects had increased to 63, the number of centres to 397, and the number of candidates to 14,004; the number of registered classes being 1764, and of students in attendance 34,176. These numbers are exclusive of those who receive instruction in manual training. The total number of students last year in the classes registered by the Institute was 36,155, as compared with 34,990 in the previous year.

THE following gifts and bequests for scientific and educational purposes are noticed in *Science*:—By the will of the late Jonas G. Clark, of Worcester, Mass., who founded Clark University in 1889, the entire estate is left to the University, providing the people of Worcester raise a fund of 500,000 dollars. If the sum of 250,000 dollars is raised, he bequeaths 500,000 dollars. If 500,000 dollars is raised, he bequeaths 1,000,000 dollars and makes the University his residuary legatee. He also leaves 100,000 dollars for the University library and a similar sum for a department of art. Messrs. Samuel Cupples and Robert S. Brookings have each given to Washington University one-half of the total capital stock of the St. Louis Terminal Cupples Station and Property Company, which company owns the so-called "Cupples Station." The annual income from this gift to the University will be from 120,000 to 130,000 dollars per year. The gift is to form a permanent endowment fund, the interest of which is to be expended by the Board of Directors in any way which it sees fit. Dr. D. K. Pearsons has offered 50,000 dollars to Carleton College, Northfield, Minn., on condition that the college authorities raise 100,000 dollars before January 1,

1901. By the will of Henry M. Curry the Western University of Pennsylvania receives 10,000 dollars for scholarships; and the University of Pennsylvania has received 20,000 dollars from Mr. J. D. Lippencott and Mr. J. G. Carruth respectively.

THE second general meeting of the Agricultural Education Committee was held on Friday last at the rooms of the Society of Arts. The report of the executive to the general committee gave a brief account of the constitution and proceedings of the committee from its commencement, and explained that its objects were: (1) to secure systematic and efficient instruction, both theoretical and practical, in agricultural subjects suitable to every class engaged in agriculture; and (2) to diffuse among the agricultural classes a more thorough appreciation of the advantages of instruction bearing directly or indirectly on their industry. The policy of the committee, the report stated, was largely recognised in the new Day School Code; and the block grant, the continuous course of rural instruction, lessons in "common things" given through the standards, and the new subject of household management for girls, were all on the lines of the committee's resolutions. Moreover, the executive believed that it was largely due to the representations of the committee that the new Board of Education, shortly after its formation, issued a circular to managers and teachers of rural elementary schools impressing on them the importance of making education in the village school more consonant with the environment of the scholars than was now usually the case, and especially encouraging the children to gain an intelligent knowledge of the common things which surround them in the country. Other provisions of the new Code were referred to with satisfaction, and the report stated that the committee had not failed to co-operate with the Board of Education in bringing them into effect. With regard to the work which remained to be done, attention should be given to organisation. It would seem that the precedent successfully set some years ago in Scotland of handing over the educational work of the Board of Agriculture to an educational authority, while leaving to the Board the inspection of experimental and research work, might well be followed. If that was not done, and the present division of functions continued, the cause of rural education, especially in its higher branches, would undoubtedly suffer. It was also to be hoped that attention would be given to the training of teachers, and that the new Board would introduce some modifications into the curricula of the training colleges to ensure the qualification of a certain number of trained teachers to give instruction on elementary science and common things required by the Code. A good deal also remained to be done in placing evening continuation work on a satisfactory footing.

SCIENTIFIC SERIALS.

American Journal of Science, June.—A method of studying the diffusion (transpiration) of air through water, and a method of barometry, by C. Barus. The diffusion of air through water is studied by observing the gradual loss of the air contained in a Cartesian diver, and this loss is determined from the change in the temperature coefficient contained in the equation of flotation. The same equation also involves in a simple manner the height of the barometer; and a Cartesian diver apparatus is, therefore, virtually a water barometer which need only be one foot high instead of thirty feet.—Separation and determination of mercury as mercurous oxalate, by C. A. Peters. The author estimates mercurous salts volumetrically by precipitating with ammonium oxalate, and determining the oxalic acid by potassium permanganate, and gravimetrically by direct weighing of the precipitate.—Electrical resistance of thin films deposited by cathode discharge, by A. C. Longden. The thinnest films have a resistance which is very much higher than is warranted by their thinness. The sign of the temperature coefficient of resistance varies with the thickness, and it is therefore possible to obtain resistances by cathode-ray deposition which do not vary with the temperature. Such resistances form valuable high-resistance standards.—New meteorite from Oakley, Logan county, Kansas, by H. L. Preston. This is a siderite of 61 lbs. found in 1895.—Some observations on certain well-marked stages in the evolution of the Testudinate humerus, by G. R. Wieland. The development of the humerus of the turtle presents a special interest on account of its graduated change of habitat from dry deserts to the ocean.—Geothermal gradient in Michigan, by A. C. Lane. The geothermal gradient at Bay City is 1.5 degrees F. per 100

feet. The Upper Peninsula is a region notorious for its much lower gradient. The author discusses the various hypothesis framed to account for the differences in the gradient. Among these are the cooling action of Lake Superior, a survival of the Ice Age coldness, and differences in the conductivity of rocks. The author favours the last hypothesis.—Production of X rays by a battery current, by J. Trowbridge. The installation of a plant of 20,000 storage cells at the Jefferson Physical Laboratory has enabled the author to obtain X-rays of exceptional brilliancy, yielding negatives of great contrast. When the X-ray tube is first connected with the battery terminals no current flows. It is necessary to heat the tube, when it suddenly lights up. A distilled-water resistance of about 4,000,000 ohms is inserted in the circuit.

Annalen der Physik, No. 5.—Change of conductivity of gases by a continuous electric current, by J. Stark. The resistance of a gas conveying an electric current is highest near the electrodes, owing to the accumulation of ions of the same sign in this neighbourhood. It has another maximum near the middle, but rather more towards the side of the anode. The resistance is influenced by the heat developed at the electrodes, by the kathode rays, and by the unequal speed at which the two kinds of ions travel through the gas.—Objective presentation of the properties of polarised light, by N. Umow. A beam of parallel plane-polarised light is allowed to fall on various geometrical bodies whose surfaces have peculiar optical properties, such as a cone covered with fuchsine, a quartz plate, or a Babinet compensator. The reflection or transmission of the light gives rise to striking colour phenomena. Peculiar spiral effects are obtained by sending the beam through an opalescent colophonium emulsion.—Magnetic screening, by H. du Bois and A. P. Wills. In this portion of their work, the authors calculate and verify the effect of a triple screen of iron for galvanometers. The external diameters of the three screens are 2.5, 4.3 and 8.0 cm. respectively, and their thicknesses are 0.27, 0.18 and 0.18 cm. The total theoretical "screening ratio," *i.e.* the ratio by which the disturbing magnetic field is reduced, is 60.2, and the observed ratio is 64.6.—Armoured galvanometers, by H. du Bois and H. Rubens. Describes some galvanometers screened in accordance with the results of the previous paper.—Rotating magnetic flag, by G. Jaumann. A small magnet mounted like a flag on a glass rod as an axis may be given a continuous rotation by immersing it in mercury contained in a glass vessel surrounded by a tight-fitting copper vessel, with a current traversing the body of the mercury and returning through the copper vessel. The work spent in overcoming the resistance of the mercury is derived from the current itself. It appears as a counter E.M.F. until the mercury rotates with the magnet.—Thermal deformation of balances, by T. Middel. Delicate balances show a considerable change of sensitiveness with the temperature. The author shows that this is due to the bending of the beam of the balance, owing to the unequal expansion of the upper and the lower portion, and that is due to the unequal working of the metal, the coefficient of expansion for cast brass being less than that of rolled brass.—The additive character of atomic heats, by S. Meyer. The author shows that in the case of twenty-six oxides an excess of the sum of atomic volumes over the molecular volume is accompanied by an excess of the aggregate atomic heats over the molecular heat, and that a defect of atomic volumes is accompanied by a defect of atomic heats in the same manner. Boron and bismuth sesquioxides are the only exceptions.

Bulletin de l'Académie des Sciences de St. Pétersbourg, vol. viii. No. 1.—Yearly report of the Academy.—A newly-discovered Old Turkish inscription, by Dr. W. Radloff, preliminary report. The inscription was discovered by Madame Elizabeth Clements near Urga, and excellent reproductions of it were made. Dr. Radloff found that it was made in honour of the wise Toyukuk, father-in-law of Bilga-khagan, who was born in 646 of our era.—On the elements of earth-magnetism at Kamenets, Khotin and Odessa, by W. Dubinsky.

Vol. viii. No. 2.—On the rapid motion of the line of the absides in the system of α Gemini, by A. Byelopolsky.—On the spectroscopic determination of the movements of γ Virginis, by the same.—Aurora borealis observed at Pavlovsk on December 20, 1897, by V. Kuznetsoff, with two photographs.—Hydrobiological researches at the Sebastopol Biological Station, by A. Ostrooumoff.

Vol. viii. No. 3.—On the attempts at reproducing cometary

phenomena by means of experiments, by Th. Bredikhin (in Russian). The recent results obtained by photography permitted us to obtain most exact reproductions of cometary forms. They stimulated the desire of producing theories of comets, and, as far as the author knows, five different theories were proposed lately; they differ essentially in their fundamental principles. No great comets having appeared lately, the earlier drawings, made by previous astronomers, necessarily must be taken into account. Bredikhin found it necessary, therefore, to systematically discuss the facts which relate to the variety of forms of comets, and the passages from the one form to another. These facts can be ignored by no theory, and the author consequently analyses those criteria which must be applied to each theory of the comets.—On the way of building magnetic observatories, by H. Wild.—Description of a very rare case of *Craniopagus parietalis*, by J. Ziematzky (plate).—On the influence of the terms of third order in the perturbations function of the movement of the earth round its centre of gravity on the formulæ of nutation, by A. Ivanof (in French). The author gives a new formula for reducing the length of the second pendulum for any geocentric latitude.

Vol. viii. No. 4.—Ephemerid of the comet of Encke from June 1 to July 31, 1898, by A. Ivanoff.—On the differences of the horizontal intensities of earth magnetism obtained from observations of the unifilar and the bifilar theodolite, by H. Wild.—Positions of 1041 stars of the star-cluster 5 Messier, deduced from photographs, by Madame Shilow. Full list, compiled from careful measurements made on photographic plates.

SOCIETIES AND ACADEMIES.

LONDON.

Royal Society, May 31.—"The Crystalline Structure of Metals." Second Paper. By Prof. J. A. Ewing, F.R.S., and Walter Rosenhain, B.A.

The investigations described in this paper deal principally with the phenomena of annealing. The first section of the paper describes experiments made in the hope of observing under the microscope the process of recrystallisation in strained iron. This attempt to watch the process of recrystallisation failed, although the experimental difficulties of keeping a specimen under microscopic observation while it was being heated were successfully overcome. The specimen was electrically heated in a vessel with a thin glass or mica window, and the microscope-objective was kept cool by directing a strong blast of cold air on it and on the surface of the window.

The next section of the paper deals with the changes of crystalline structure which go on in lead and other metals at comparatively low temperatures. The authors' attention was directed to this by noticing that a piece of plumber's sheet lead, when etched with dilute nitric acid, exhibits a strikingly crystalline structure, with large crystals. The character of this appearance led the authors to the view that a slow process of annealing or recrystallisation was at work in such lead at ordinary atmospheric temperatures, and the authors have satisfied themselves that this is the case. The method of investigation consisted in taking a series of micro-photographs, at low magnifications, of certain marked areas in the surface of a specimen, in order to watch the change which went on through lapse of time, or after application of some thermal treatment.

When a piece of cast lead is severely strained by compression, the originally large crystals, after being considerably flattened, are driven into and through one another, so that the etched surface of a strained specimen presents a fine grain, whose crystalline nature only becomes apparent under considerable magnification (80 to 100 diameters). A piece of lead severely strained in this way, and kept for nearly six months in an ordinary room without any special thermal treatment, was found to be undergoing continuous change during that time. A series of photographs of this specimen, taken at intervals during the six months, show that a great number of the small crystals have grown larger at the expense of their neighbours. In similar specimens which have been kept at 200° C., the growth has been much more rapid and more pronounced. The rate of growth is a function of time and temperature, but some specimens show much more rapid changes than others under similar conditions of temperature; in some cases five minutes' exposure to a temperature of 200° C. is sufficient to alter the